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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference<br>YU185   | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416). |   |
| International Application No.<br><br>PCT/AU2002/000775   | International Filing Date<br>(day/month/year)<br>14 June 2002   | Priority Date (day/month/year)<br>12 April 2002 |
| International Patent Classification (IPC) or national classification and IPC<br>Int. Cl. <sup>7</sup> B41J 2/05, B81B 3/00 |   |   |
| Applicant<br>SILVERBROOK RESEARCH PTY LTD et al  |   |   |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheet(s).

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

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|--|--|
| Date of submission of the demand<br>14 October 2003  | Date of completion of the report<br>21 July 2004                         |
| Name and mailing address of the IPEA/AU<br>AUSTRALIAN PATENT OFFICE<br>PO BOX 200, WODEN ACT 2606, AUSTRALIA<br>E-mail address: pct@ipaustralia.gov.au<br>Facsimile No. (02) 6285 3929 | Authorized Officer<br><br>BAYER MITROVIC<br>Telephone No. (02) 6283 2164 |

**I. Basis of the report****1. With regard to the elements of the international application:\***

- ☐ the international application as originally filed.
- ☒ the description, pages 1-6, as originally filed,  
pages , filed with the demand,  
pages , received on with the letter of
- ☒ the claims, pages , as originally filed,  
pages , as amended (together with any statement) under Article 19,  
pages , filed with the demand,  
pages 7, 8, received on 26 February 2004 with the letter of 26 February 2004
- ☒ the drawings, pages 1/5-5/5, as originally filed,  
pages , filed with the demand,  
pages , received on with the letter of
- ☐ the sequence listing part of the description:  
pages , as originally filed  
pages , filed with the demand  
pages , received on with the letter of

**2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.**

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

**4. ☐ The amendments have resulted in the cancellation of:**

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

**5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\***

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

**IV. Lack of unity of invention**

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☐ paid additional fees.
- ☐ paid additional fees under protest.
- ☐ neither restricted nor paid additional fees.

2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
- ☒ not complied with for the following reasons:

Two groups of claims can be clearly identified:

a) Claims 1-6 directed to a thermoeleastic actuator assembly including heating element and heat conduction means

b) Claims 7-9 directed to a method of producing thermoeleastic actuator assembly including the steps of determining a desired negative pressure, determining heat dissipation profile and forming a thermoeleastic actuator having a heat conduction means.

The common special technical feature between these two groups of claims is a generic thermoeleastic actuator assembly having heat conduction means.

However this feature is not novel when compared to any of the documents D1 and D2 considered in the box V, below.

Therefore groups of claims a) and b) lack unity a posteriori.

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☒ all parts.
- ☐ the parts relating to claims Nos.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

|                               |            |     |
|-------------------------------|------------|-----|
| Novelty (N)                   | Claims 1-9 | YES |
|                               | Claims     | NO  |
| Inventive step (IS)           | Claims 1-9 | YES |
|                               | Claims     | NO  |
| Industrial applicability (IA) | Claims 1-9 | YES |
|                               | Claims     | NO  |

**2. Citations and explanations (Rule 70.7)**

The following documents identified in the International Search Report have been considered for the purposes of this report:

D1: EP 816083 (SAMSUNG ELECTRONICS CO LTD)

D2: Derwent Abstract Accession No.97-060871/06, Class T04,  
JP 08309980 (SHARP KK)

Document D1 discloses (column 4 lines 3-19) the ink-jet printing head comprising: an ink chamber with an orifice through which ink is ejected, a heating chamber containing a working fluid separated from the ink chamber by thermally conductive and thermally expansive membrane and first and second electrode adapted to pass current through resistor. When membrane is exposed to heat it expands to eject the ink and it cools down by its own conduction and by metallisation layer on the substrate (see: column 8 lines 18-56, Figs. 8-10). The problem of long time it takes to return to original state after expansion, which is due to low heat conductivity, is clearly formulated in column 3 lines 53-57.

Document D2 discloses ink-jet head, which includes a pressure generator comprising a buckling structure, which is deformed by thermal expansion. Heater layer is provided along the length of buckling structure. A set of first and second fins whose function is to speeds-up cooling and so to provide satisfactory heating response characteristics. (See Derwent abstract and Figures of the original document).

**NOVELTY AND INVENTIVE STEP CLAIMS 1-9**

Claims 1-9 meet the criteria set forth in PCT Article 33(2) for novelty and Article 33(3) for inventive step. The documents cited above do not disclose specific features of these claims. The invention defined in these claims is also not obvious in the light of any of the cited documents nor disclosed in any obvious combination, nor would the claimed invention be obvious to a person skilled in the art in the light of common general knowledge by itself or in combination with any of these documents.

**INDUSTRIAL APPLICABILITY CLAIMS 1-9**

The invention defined in claims 1-9 is industrially applicable.